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ABSTRACT

This report presents a master plan for the development of computer science and computer-related programs at Los Angeles Trade-Technical College for 1982 through 1985. Introductory material outlines the main elements of the plan: to analyze existing computer courses, to create new courses in Laser Technology, Genetic Engineering, and Robotics; and to construct a computer center serving up to eight classes at a time. After providing an overview of the phases of the plan's implementation, the report presents descriptions of existing courses and courses proposed for 1984-85 in the areas of: (1) computer maintenance technology; (2) computer programming; (3) data processing technology; (4) microcomputer maintenance technology; (5) software support technician; (6) digital electronics technology; (7) numerical control programming; and (8) robotics technician. Next, the plan for the main computer center is presented, including information on costs, schedule, and the proposed extent of use. Appendices include a list of future courses. (HB)

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MASTER PLAN

THE INTRODUCTION

OF COMPUTER SCIENCE AND

COMPUTER RELATED INSTRUCTIONAL PROGRAMS

LOS ANGELES TRADE-TECHNICAL COLLEGE

1982-85

OI. Report # 82-07

MASTER PLAN

FOR

THE INTRODUCTION

OF

COMPUTER SCIENCE AND COMPUTER RELATED

INSTRUCTIONAL PROGRAMS

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ACKNOWLEDGEMENTS

In February of 1982 upon his acceptance of the position of Assistant Dean of Instruction, Mr. Victor Veley was requested to review the deliberations of the campus Computer Studies/Literacy Committee. This review along with his own independent investigation has resulted in this Master Plan for the development of Computer Studies at Los Angeles Trade-Technical College.

Mr. Veley's insight, his vast scientific knowledge, his knowledge of educational program development, and his genuine interest and dedication to the development of the proposed School of Science, Engineering and Technology all played important roles in the organization and writing of this plan. Los Angeles Trade-Technical College, we believe, will become an even greater institution as it implements this plan for the future. Without Mr. Veley's sound judgement and uncanny foresight the future of Computer Studies and Data Processing program development would continue to be hazy.

The final copy of this plan was typed by Linda Timmons. Special thanks to all members of the original Computer Studies/Literacy Committee and in particular to Mrs. Ann Wilson, for willingly researching and sharing their ideas.

Thomas G. Lakin
Dean of Instruction
September 1982

MEMBERS OF THE COMPUTER STUDIES/LITERACY COMMITTEE

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INTRODUCTION

The purpose of this Master Plan is to explore the creation of the Los Angeles Trade-Technical College Computer Science Department and to introduce computer science and computer related instructional programs over a minimum period of three years (September 1982-September 1985). Basically the plan consists of:

1. An analysis of the computer courses as they exist at the present time and a proposal to create the high technology courses of the future. These proposals therefore complement the High Technology Master Plan already published.
2. The creation of further new courses in the areas of Laser Technology, Genetic Engineering and Robotics. (for a description of Laser Technology and Genetic Engineering see OI Report No. 82-10 Master Plan High Technology Instructional Program Supplement # 1) These would also fall under the ultimate aegis of the Computer Science Department which would contain no less than 25 FTE instructors and would be headed by a coordinator.
3. The construction of a new Computer Center which would serve up to eight classes at any one time and have a maximum WSCH capability of 20,000. This plan suggests that the computer center could be established on the wings or in the LRC basement at an approximate cost of $1 million. The creation of the additional programs

in Laser Technology, Genetic Engineering and Robotics would involve a further $1 million. These costs could be defrayed over the three-year period.

The plan would be implemented in five sequential phases:

PHASE 1. Identification of those courses which would fall under the Computer Science Department. Some of those courses would have their subject title changed to indicate their relevance to computer technology. The development of the curricula for the computer programs in Laser Technology, Genetic Engineering and Robotics. Grants must be sought for the development of these curricula.

PHASE 2. Split Business Data Processing and Office Administration then combine Office Administration with Business Administration. Transfer Business Data Processing to Math/Science and create a coordinator for that enlarged department (renamed Math/Science/Computer Science).

PHASE 3. Create a Computer Science facility in the basement, or on the wings of the Learning Resources Center. The facility would contain the Computer Center and the classrooms/laboratories necessary for the Computer Maintenance Technician Program. The Computer Center would also provide additional training for interdisciplinary courses.

PHASE 4. Transfer the COMTEK Program from Electronics to Math/Science/Computer Science Department.

PHASE 5. The establishment of the programs in Laser Technology, Genetic Engineering and Robotics. (See OI Report No. 82-10)

It is essential to realize that any serious attempt to create the Computer Science Department and the High Technology programs can only be achieved at considerable cost; adequate funding must be secured at the outset before any attempt at implementing the Master Plan.

MAJOR PROGRAMS

Associate in Science Degree

The Associate degree and certificate programs offered at Los Angeles will be significantly influenced by industry advisory committees. This vital relationship with industry will be helpful in identifying areas of high level technology in need of trained technicians. A preliminary review of current industry demands indicates the curriculum offerings described in this report would result in technicians for which there is a high demand. The descriptions which follow provide an overview of the area of study, type of work the person will perform, and areas of employment. A listing of courses for these Associate in Science Degree Programs is outlined for each subject area.

In addition to these major programs, an important function of the computer sciences department will be that of providing new courses in programs and disciplines impacted by microprocessors and computer technology.

A

COMPUTER MAINTENANCE TECHNOLOGY

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

COMPUTER MAINTENANCE TECHNOLOGY

A computer maintenance technologist provides maintenance and support for the hardware of computers sold by manufacturers. The successful field maintenance technologist must have three basic skills: the ability to think analytically, technical expertise, and interpersonal skills (customer interface). The technical skills must include at least one high-level language as well as hardware knowledge and programming knowledge in the areas of operating systems.

A student electing to enter the field of computer maintenance technology would require advanced preparation for entry into the curriculum. A prerequisite of one year of high school algebra and one year of geometry would be a minimum. In addition, these mathematics studies should have occurred within the previous four years with a grade of C or better. Any pre-technical courses taken at the community college should indicate a strong achievement in basic math, reading and writing skills. The core courses would center around studies in applied mathematics (including calculus), introductory physics, logic, and boolean algebra, electric circuits, beginning electronics and high level language (BASIC and/or FORTRAN). The student would complete advanced courses in the areas of machine language programming, peripheral maintenance, CPU maintenance, diagnostics, operating systems, and advanced electronics, and telecommunications.

Upon completion of the program, it is expected that the graduate would receive employment in the areas of computer field service, customer engineering, or computer hardware service representative with a major computer manufacturer.

THE PRESENT

1982-83

COMPUTER MAINTENANCE TECHNICIAN

Requirements for the Associate in Science Degree in Computer Maintenance Technician may be met by completing the essential courses below and sufficient electives to meet the 60-unit requirement.

ESSENTIAL COURSES

General Education requirement for the Associate Degree is 18 units minimum, including Natural Sciences 3, Social Sciences 3, Humanities 3, Learning Skills 3, Health 2.

FIRST SEMESTER		UNITS
ETNTLGY 111	Electronics Mathematics	2
ETNTLGY 112	Fundamentals of D.C. and A.C.	4
ETNTLGY 113	Electronics Laboratory 1	5
ETNTLGY 114	Physics Laboratory I (Physics 14)	1
SECOND SEMESTER		
ETNTLGY 121	Principles of semi-conductors Tubes and Electronic Circuits	6
ETNTLGY 122	Physics Laboratory II (Physics 29B)	1
ETNTLGY 123	Electronics Laboratory II	5
THIRD SEMESTER		
CO. SCI 136	Numeration Systems, Elements of Programming, and Technical Report Writing	3
CO. SCI 134	Digital Systems Laboratory I	3
CO. SCI 138	Logic Timing & Computer Circuit Analysis	3
CO. SCI 135	Digital Systems Laboratory II	2
CO. SCI 133	Lasers and Opto-Electronics I	1

FOURTH SEMESTER		UNITS
CO. SCI 140	Advanced Programming Maintenance & Computer Circuit Analysis	3
CO. SCI 146	Digital Systems Laboratory III	3
CO. SCI 142	Computer Peripherals, Integrated Circuits and Employment Information	3
CO. SCI 147	Digital Systems Labortory IV	2
CO. SCI 148	Lasers and Opto-Electronics II	1

FIRST SEMESTER UNITS

ETNTLGY 111 Electronics Mathematics 2

Prerequisite: Electronics Assistant 111, 112, or equivalent
This course should be taken concurrently with Courses No. 112, 113,114.
Lecture, 2 hours

This course offers a review of basic arithmetic including addition, subtraction, multiplication, division, fractions, decimals, square roots, signed numbers, powers of ten, and introduction to algebra, and problems involving Ohm's Law and power calculations. Instruction is also provided in algebra, calculators, logarithms, graphs, phasors, basic trigonometry as used in electronics. Problems illustrating the relation of peak, r.m.s., average, and peak to peak values in sine waves are presented.

ETNTLGY 112 Fundamentals of D.C. and A.C. 4

Prerequisite: Electronics Assistant 111, 112, or equivalent
This course should be taken concurrently with courses No. 111, 113, 114.
Lecture, 4 hours

Instruction is given in basic electrical concepts, electron theory, Ohm's Law, Kirchhoff's Law, series circuits, parallel circuits, combination circuits, principles of magnetism; and the care, use, and construction of basic meters for voltage, current and resistance measurements. Problems illustrating accuracy necessary in measurements are given. Principles of alternating current, capacitance, inductance, reactance, impedance, resonance, transformers, and alternating current measuring devices are taught. Discussions are conducted on the effects of wave shape and A.C. measurements.

FIRST SEMESTER (Cont.) UNITS

ETNTLGY 113 Electronics Laboratory I 5

Prerequisite: Electronics Assistant 111, 112, or equivalent.

This course should be taken concurrently with courses No. 111, 112, 114.

Laboratory, 15 hours

Instruction and practice are given in general shop safety, care and use of hand tools and power tools, soldering techniques, hardware identification and use, chassis layout and forming, printed circuit techniques, components, color codes, symbols, direct current circuits, and measuring equipment. The student constructs and analyzes series and parallel RC, RL, and RCL circuits, and becomes familiar with A.C. measuring devices. Special emphasis is placed on care and use of the oscilloscope, and measurements of various wave shapes.

ETNTLGY 114 Physics Laboratory I 1

Prerequisite: Electronics Assistant 111, 112, or equivalent.

This course should be taken concurrently with Courses No. 111, 112, 113.

Laboratory, 3 hours

The student, through experiments, becomes familiar with the concepts and law of magnetism, electrostatics, chemical effects of current, and the laboratory methods of measurements and calculations.

SECOND SEMESTER UNITS

ETNTLGY 121 Principles of Semi-Conductors, Tubes and Electronic Circuits 6

Prerequisite: Electronics Technology 111, 112, 113, 114, or equivalent.

This course should be taken concurrently with Courses No. 122, 123.

Lecture, 6 hours

Instruction is offered in the basic principles and applications of semi-conductor devices. Included are PN junction diodes as a voltage reference, tunnel diodes, metallic rectifiers, transistors,

and new devices as they are developed. Also covered are electron emission, diodes, triodes, multigrid tubes, special tubes, tube ratings, and the use of the tube manual. Instruction is given in the theory and operation of power supplies, amplifiers, detectors, oscillators, converters and receivers.

ETNTLGY 122 Physics Laboratory II 1

Prerequisite: Electronics Technology 111, 112, 113, 114 or equivalent, This course should be taken concurrently with Courses No. 121, 123.
Laboratory, 3 hours

The student, through experiments, becomes familiar with simple machine elements, torque, work, power and efficiency, forces, properties of materials, motion laws, energy and momentum, and rotary and vibratory motion. Vectors are used in the solution of problems.

ETNTLGY 123 Electronics Laboratory II 5

Prerequisite: Electronics Technology 111, 112, 113, 114 or equivalent. This course should be taken concurrently with Courses No. 121, 122.
Laboratory, 15 hours

The student measures and analyzes the parameters and characteristics of semi-conductor devices and electron tubes, studies some of their applications, and becomes familiar with the use of tube and transistor testers. The student also constructs, tests, and analyzes power supply circuits, receivers, amplifier circuits, detector circuits, oscillator circuits, and converter circuits. Trouble shooting procedures and techniques are introduced, including the logical selection, calibration, and accuracy determination of test instruments.

THIRD SEMESTER (Cont.) UNITS

CO. SCI 136 Numeration Systems, Elements of Programming and Technical Report Writing 3

Prerequisite: Electronics Technology 121, 122, 123, or equivalent. This course should be taken concurrently with Courses No. 133, 134, 135, 138.

Lecture, 3 hours

The student is introduced to computer concepts and basic programming, and learns to write technical reports suitable for use by computer maintenance technicians.

CO. SCI 134 Digital Systems Laboratory I 3

Prerequisite: Electronics Technology 121, 122, 123 or equivalent. This course should be taken concurrently with Course No. 133, 135, 136, 138.

Laboratory, 9 hours

The student is responsible for running programs on the computer and for solving problems in a self-developed program.

CO. SCI 138 Logic Timing and Computer Circuit Analysis 3

Prerequisite: Electronics Technology 121, 122, 123, or equivalent. This course should be taken concurrently with Courses No. 133, 134, 135, 136.

Lecture, 3 hours

Instruction and demonstrations are given in the overall theory of operation; functions of registers; and circuits such as and/or gates, power supplies, and core memory as applied to computers.

THIRD SEMESTER (Cont.) UNITS

CO. SCI 135 Digital Systems Laboratory II 2

Prerequisite: Electronics Technology 121, 122, 123, or equivalent. This course should be taken concurrently with Courses No. 133, 134, 136, 138.

Laboratory, 6 hours

The student is introduced to computer malfunction analysis and troubleshooting by running a typical program in a step-by-step sequence. Also basic computer circuits such as and/or gates and power supplies are constructed and tested operationally.

CO. SCI 133 Lasers and Opto-Electronics I 1

Prerequisite: Electronics Technology 121, 122, 123, or equivalent. This course should be taken concurrently with Courses No. 134, 135, 136, 138.

Laboratory, 3 hours

The student, through experiments, is trained in geometrical and physical optics. Training in ray tracing, real lenses, photometry, optoelectronics, coherent light interference, dispersion, standing waves, microwaves, and fluorescence is included. Students compute values from mathematical theory.

FOURTH SEMESTER

CO. SCI 140 Advanced Programming Maintenance & Computer Circuit Analysis 3

Prerequisite: Computer Maintenance Technician 133, 134, 135, 136, 138, or equivalent.

This course should be taken concurrently with Courses No. 142, 146, 147, 148.

Lecture, 3 hours

The student learns to understand and write programs for more complex problems. The theory of complete computer operational checkout through the use of maintenance programs is presented. The theory of individuals circuits such as the monostable multivibrator, bistable multivibrator, delaying circuits, and the register is mastered by the student.

CO. SCI 146 Digital Systems Laboratory III 3

Prerequisite: Computer Maintenance Technician 133, 134, 135, 136, 138 or equivalent.

This course should be taken concurrently with Courses No. 140, 142, 147, 148.

Laboratory, 9 hours

Application is provided in advance programming techniques by actually running programs on the computer for complex problems. Maintenance programs are also run on the computer to check for malfunctions. Malfunctions are analyzed and simulated when the student constructs and tests such circuits as bistable multivibrators, delaying and switching circuits.

CO. SCI 142 Computer Peripherals, Integrated Circuits and Employment Information 3

Prerequisite: Computer Maintenance Technician 133, 134, 135, 136, 138 or equivalent.

This course should be taken concurrently with Courses No. 140, 146, 147, 148.

Lecture, 3 hours

The student learns the electronic and mechanical theory of operation of computer peripheral equipment such as paper punches,

paper tape readers, and printers. Integrated circuit theory of operation on such circuits as gates, flip-flops, adders, and registers is presented. The student prepares to market newly acquired talents through local industry field trips, job interviews, resume-writing, and completion of job applications.

CO. SCI 147 Digital Systems Laboratory IV 2

Prerequisite: Computer Maintenance Technician 133, 134, 135, 136, 138 or equivalent.

This course should be taken concurrently with Courses No. 140, 142, 146, 148.

Laboratory, 6 hours.

The student troubleshoots computer peripherals such as paper tape punches and paper tape readers for both electronic and mechanical malfunctions. Typical computer integrated circuits are combined with external components and tested operationally.

CO. SCI 148 Lasers and Opto-Electronics II 1

Prerequisite: Computer Maintenance Technician 133, 134, 135, 136, 138.

This course should be taken concurrently with Courses No. 140, 142, 146, 147.

Laboratory, 3 hours

The student, through experiments, is trained in wave optics and atomic theory, basic operation of a laser, and applications of laser beams. Training in color vision, atomic theory, interferometers, image processing, laser output, filters, power supplies, operating curves, laser speckles, optic fibers, beam modulation, and holography is included. Students compute values from mathematical theory.

THE FUTURE

1984-85

COMPUTER MAINTENANCE TECHNOLOGY

ASSOCIATE IN SCIENCE DEGREE

ESSENTIAL COURSES

FIRST SEMESTER			HOURS/WEEK
EL.	101	Electric Circuits (AC & DC Networks)	7
MATH	105	Applied Math I (Integrated Algebra & Trigonometry)	3
CO. SCI	105	Computer Logic & Arithmetic	7
ENGLISH	100	Technical English	3
CO. SCI	106	Fortran IV	4
SECOND SEMESTER			
MATH	106	Applied Math II (Introductory Calculus)	3
EL.	106	Electron Devices (Solid State)	6
CO. SCI	110	Machine & Assembly Language Programming	4
HIST.	101	U. S. History (Economics Viewpoint)	
PHYS.	101	General Physics I	7
THIRD SEMESTER			
MATH	207	Applied Math III (Differential Equations)	3
EL.	208	Digital/Analog Microintegrated Circuits	7
CO. SCI	220	Input/Output Devices	7
CO. SCI	222	Memory Systems	4
HUM.	100	Humanities (Man in Technological Society)	3
FOURTH SEMESTER			
CO. SCI.	230	Computer Systems	7
CO. SCI	240	Microprocessor Systems	4
CO. SCI	250	Data Communications	4
SPEECH	100	Speech (Business Emphasis)	3

FIRST SEMESTER HOURS/WEEK

EL. 101 Electric Circuits (AC & DC Networks) 7

Instruction is given in basic electrical concepts, electron theory, Ohm's Law, Kirchhoff's Laws, series circuits, parallel circuits, combination circuits, principles of magnetism; and the care, use, and construction of basic meters for voltage, current, and resistance measurements. Problems illustrating accuracy necessary in measurements are given. Principles of alternating current, capacitance, inductance, reactance, impedance, resonance, transformers, and alternating current measuring devices are taught. Discussions are conducted on the effects of wave shape and A.C. measurements.

MATH 105 Applied Math I (Integrated 3

Provides an introduction to the practical application of mathematics as needed in industry. Fractions, decimals, percentage, square and square roots, constants, solids, etc. are reviewed. Emphasis is on the solution of technical problems beneficial to those engaged in an industrial trade.

CO. SCI 105 Computer Logic and Arithmetic 7

Studies the fundamentals of digital computers from a non-mathematical approach. The student is first introduced to general purpose computing systems and the concept of stored program computers. The basic ideas of programming are presented to develop an understanding of the logical organization of a digital system. The study of peripheral equipment touches upon card readers, punches, printers, tapes, and disc drives. Boolean algebra, logic gates, and number systems are thoroughly discussed.

FIRST SEMESTER (Cont.) HOURS/WEEK

ENGLISH 100 Technical English 3

Includes training, for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

CO. SCI 106 Beginning FORTRAN IV Programming 4

Introduces the student to computer principles. The student will program in the FORTRAN IV language, using a wide variety of applications. To be taught on the department's computer system.

SECOND SEMESTER

MATH 106 Applied Math II (Introductory Calculus) 3

Includes functions and limits, derivatives and their applications, differentials, integrals, and their applications.

EL. 106 Electron Devices (Solid State) 6

Presents principles of operation of semiconductor, diodes, bipolar transistors, fets, mosfets, and special purpose electron devices such as SCR's, tunnel diodes, 4-layer devices, Zener devices, vacuum tubes, cathode ray tubes, color TV picture tubes. Provides analysis of DC load lines, power operating stabilization, common base, collector, and emitter configurations, and triode, and beam power tube biasing.

CO. SCI 110 Machine & Assembly Language 4

The students will study the fundamentals and applications of

SECOND SEMESTER (Cont.) HOURS/WEEK

IBM system/360 and system/370 Assembler Language. Topics covered include numbering systems, system organization, instruction formats, data formats, PSW and interrupt. Also included are the writing of programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

HIST. 101 U. S. History (Economics Viewpoint) 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement for transfer to the California State University and Colleges.

PHYS. 101 General Physics I 7

Considers the fundamental principles and applications of mechanics, heat, fluids, wave motion and sound.

THIRD SEMESTER

MATH 207 Applied Math II (Differential Equations) 3

Advanced topics in algebra, geometry and trigonometry are considered in relation to their usefulness to persons employed in industry; applications are included.

EL. 208 Digital/Analog Microintegrated Circuits 7

Covers theory and interface of linear and linear/digital interface integrated circuits. DC basic circuits, input/output resistance, drift, input offset/bias current, models, CMRR, open and closed loop gains and frequency response are covered. Application to differential,

operational and video amplifiers. Voltage regulators, MOS interface, peripheral driver, core memory, line transmission circuits, and phase lock loop circuits.

CO. SCI 220 Input/Output Devices 7

Discusses input and output requirements of a computing system. Introduces the student to various types of input/output devices in a typical system including readers, punches, printers, visual displays, tape and disc drives. Individual trouble shooting projects are presented with the object of stressing mechanical, electrical and logical principles of operation.

CO. SCI 222 Memory Systems 4

This course introduces electronic control circuits using solid state devices and electron tubes and presents principles of memory devices, counting, adding, multiplying, and dividing circuits as used in a binary digital computer. The laboratory section gives working experience with a series of solid state circuits which function as logical elements or as amplifiers or power supplies in a modern digital computer.

HUM. 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosphy, and history in an exploration of the urban environment and society as it has been affected by technology.

FOURTH SEMESTER

CO. SCI 230 Computer Systems 7

Examines a computer system, using manufacturer's manuals. Circuiting and circuit tracing are studied to analyze how the

computer performs various instructions. Diagnostics and trouble-shooting techniques are stressed.

CO. SCI 240 Microprocessor Systems 4

Provides an introduction to a survey of various microprocessor units with in-depth analysis and operation of a selected micro-processor. Emphasis is placed on the architecture, instruction set, I/O interfacing, and typical applications. Microprogramming techniques, microde, and control of memories are studied. Lab activity will include the writing, running, and debugging of short test routines. These routines will be similar to those used to check for hardware malfunctions.

CO. SCI 250 4

Provides an overview of data communications using the DEC PDP 11/34 computer system for troubleshooting and hands on experience. The subjects covered include data communications systems, transactions, media, carriers, networks, checking, format, protocols, terminals and system configurations (hardware/software).

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery for everyday life. Emphasizes the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

COMPUTER MAINTENANCE TECHNOLOGY

BUDGET ANALYSIS

THE PRESENT

1982-83

ACTIVITY CODE	OBJECT CODE	TITLE	CLASS CODE	BASIS	FTE	HOURS	REQUEST BUDGET $
0701	1111	INSTR.FTE	0741	C6	2.00		65,035
0701	1315	INSTR.PT	0811	C		240.00	6,382
0701	4521	SUPPLIES	0000				5,000
			TOTAL FOR ACTIVITY 0791				76,417

Total number of COMTEK Day Students = 600, WSCH 1260

EXISTING COMTEK LABORATORY (E104)

Main Items of Computer Equipment

1. IBM System 3.
2. 22 IBM Microcomputers
3. 12 HP Microprocessor labs.

COMPUTER MAINTENANCE TECHNOLOGY

BUDGET ANALYSIS

THE FUTURE

1984-85

ACTIVITY CODE	OBJECT CODE	TITLE	CLASS CODE	BASIS	FTE	HOURS	REQUESTED BUDGET $
0701	1111	INSTR.FTE	0741	C6	3.00		80,000
0701	1315	INSTR.PT	0811	C		480.00	16,000
0701	4521	SUPPLIES	0000				10,000
			TOTAL FOR ACTIVITY 0791				106,000

PROPOSAL II: Following the creation of the Computer High Technology Center (1984-85), transfer the COMTEK program to the Department of Math, Computer/Physical/Biological Sciences. The department instructor complement would be increased to 23 FTE positions. This change would involve no increase in budget.

B

COMPUTER PROGRAMMING

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

COMPUTER PROGRAMMING

The computer programming curriculum prepares the student to enter the job market as a programmer analyst or system analyst. Many individuals in this field are classified as software (programming) specialists. This indepth computer specialist must readily handle the concepts of all computer environments ranging from multi-programming, multi processing to tele-processing networks and multi-tasking. Large companies or organizations which have a computer would hire programmer analysts to staff departments dedicated to computer support. The student entering this curriculum must learn not only high-level languages but must have some working familiarity with hardware and mathematics.

Prior preparation in mathematics is not required for entrance into the program; however, the student must complete course work in algebra and logic after enrolling.

Areas of study should include: beginning FORTRAN, applied mathematics, beginning assembly language, introductory COBOL, computer logic and boolean algebra. Advanced studies would include the areas of operating systems, job control language, advanced assembly language and advanced computer operations.

Job placement at the completion of the program would be as a basic programmer. Employment opportunities are available in a number of work settings, primarily in companies which purchase or lease computer systems.

THE PRESENT

1982-83

COMPUTER PROGRAMMING

There is no such program in existence at the present time.

THE FUTURE

1984-85

COMPUTER PROGRAMMING

FIRST SEMESTER			HOURS/WEEK
CO. SCI	101	Introduction to Computer Programming	3
CO. SCI	102	Programming in PASCAL	4
MATH	103	Computer Mathematics	3
HUM.	100	Humanities (Man in Technological Society)	3
CO. SCI	105	Computer Logic & Arithmetic	7
SECOND SEMESTER			
CO. SCI	110	Machine and Assembly Language	4
CO. SCI	106	Beginning FORTRAN IV Programming	4
ENGLISH	100	Technical English	3
HIST.	101	U.S. History	3
		Science Elective	
THIRD SEMESTER			
CO. SCI	236	IBM Assembly	4
CO. SCI	223	Operating Systems	3
CO. SCI	237	Job Control Language	4
CO. SCI	212	COBOL I	4
MATH	209	Statistics	3
BUS	33	Report Writing	3
FOURTH SEMESTER			
CO. SCI	280	Advanced Assembly	4
CO. SCI	270	Data Base Management	3
CO. SCI	214 or 142	Advanced COBOL or FORTRAN	4
CO. SCI	250	Data Communications Systems	4
SPEECH	100	Speech (Business Emphasis)	3

FIRST SEMESTER HOURS/WEEK

CO. SCI 101 Introduction to Computer Programming 3

This is an introduction to the principles of store-program digital computers. Included are applications of digital computers; preparation of programs for solving problems of varying degrees of difficulty, using a simplified coding system. Limits to transfer credit.

CO. SCI 102 Programming in Pascal 4

Introduces the fundamental concepts of Assembly language programming. To be taught on Department's computer system.

MATH 103 Pre-Computer Mathematics 3

Covers the concepts of basic mathematical functions, algebraic and graphic equations, and systems of equations. Emphasis is placed on operational knowledge. Trigonometry is investigated and its dependence on, and inter-relationships with, algebra are utilized in an applied approach.

HUM. 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

CO. SCI 105 Computer Logic & Arithmetic 7

Studies the fundamentals of digital computers from a non-mathematical approach. The student is first introduced to general purpose computing systems and the concept of stored program computers. The basic ideas of programming are presented to develop an understanding of the logical organization of a digital system. The

study of peripheral equipment touches upon card readers, punches, printers, tapes, and disc drives. Boolean algebra, logic, logic gates, and number systems are thoroughly discussed.

SECOND SEMESTER

CO. SCI 110 Machine & Assembly Language 4

The students will study the fundamentals and applications of IBM System/360 and System/370 Assembler Language. Topics overed include numbering systems, system organization, instruction formats, data formats, PSW and interrupt. Also included are the writing programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

CO. SCI 106 Beginning FORTRAN IV Programming 4

Introduces the students to computer principles. The student will program in the FORTRAN IV language, using a wide variety of applications. To be taught on the department's computer system.

ENGLISH 100 Technical English 3

Includes training for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

HIST. 101 U. S. History (Economic) 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of

SECOND SEMESTER (Cont.) HOURS/WEEK

industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirements for transfer to the California State University and Colleges.

THIRD SEMESTER

CO. SCI 236 IBM Assembly 4

Prepares the student to write application programs in Assembly Language for the Central District's Computer System.

CO. SCI 223 Operating Systems 3

Analyzes a variety of computer operating systems; their organization, generation, and operation. Provides instruction and experience using Assembler-level languages to operate the system.

CO. SCI 237 Job Control Language 4

Includes basic concepts of Job and Data Management and how to code and debug the JOB EXECUTIVE, and DD statements. Students learn how to code, to override and to add statements and parameters, to catalog procedures, and to assemble and run a program.

CO. SCI 212 COBOL 1 4

The student will study the fundamentals and applications of ANS COBOL. This will include language elements, program structure, COBOL entry formats, data movements, arithmetic operations. Also included is the coding of ANS COBOL programs employing table handling, tape and card input and output files and tape file maintenance.

MATH 209 Statistics 3

Discusses measures of central tendency and dispersion, probability sampling, estimation, hypothesis testing, analysis of

THIRD SEMESTER (Cont.) HOURS/WEEK

variance, chi square analysis, and some simple linear regression.

BUS. 33 Report Writing 3

The written reports as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

FOURTH SEMESTER

CO. SCI 280 Advanced Assembly Science Elective 4

Prepares the student to utilize the Computer's Operating System which controls the application program and all Input/Output devices.

CO. SCI 270 Data Base Management 3

Covers the development and use of management information systems. Included are physical and logical structures, data independence and file organization for batch and online systems.

CO. SCI 214 COBOL 11 4

The student will study advanced techniques found in ANS COBOL and IBM extension to the language. Topics covered include sequential disk processing, indexed sequential files (creation, sequential access, random access, update, maintenance), program debugging, sort/merge, subprogram linkage, source program library facility, and improved programming techniques including structured programming.

CO. SCI 250 Data Communications Systems 4

Provides an overview of data communications using the DEC PDP 11/34 computer system for troubleshooting and hands on experience.

The subjects covered include data communications systems, transactions, media, carriers, networks, checking, format, protocols, terminals and system configurations (hardware/software).

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery of everyday life. Emphasizes the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

C

DATA PROCESSING TECHNOLOGY

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

DATA PROCESSING TECHNOLOGY

The data processing curriculum prepares the student to work in business applications of computer programming. Specifically, a data processing technologist functions as a programmer converting appropriate business needs to the format most effectively processed by a computer.

Although no formal math prerequisite is needed, the student should have a knowledge of elementary algebra before beginning the second semester.

The curriculum not only includes a significant amount of course work in computers, but in general business as well. In addition, the student must study Mathematics through statistics in order to gain the insights necessary for successful growth on the job.

Graduates in this field are employed in medium to large acccunting firms and in general business firms as knowledgeable support and as liaison personnel to the corporate treasurer's staff.

THE PRESENT

1982-83

This two year occupational curriculum provides training in business and accounting with specific emphasis on computer programming and business information processing.

ESSENTIAL COURSES:

General Education requirement for the Associate Degree is 18 units minimum, including Natural Sciences 3, Social Sciences 3, Humanities 3, Learning Skills 3, Health 2.

FIRST SEMESTER			UNITS
HUM	100	Humanities	3
CO. SCI	1	Principles of Business Data Processing I	3
CO. SCI	7	RPG Programming	3
CO. SCI	23	Programming Laboratory	1
CO. SCI	11	Punched Card Accounting Systems and Management	3
SECOND SEMESTER			
HIST.	100	U.S. History (Economic Emphasis)	3
ACCT	1	Introductory Accounting I	5
CO. SCI	27	Advanced FORTRAN Programming	3
CO. SCI	11	COBOL Programming	3
THIRD SEMESTER			
CO. SCI	10	Advanced COBOL Programming	3
CO. SCI	18	Assembly Language Programming	3
CO. SCI	8	Business Data Processing Systems	3
CO. SCI	3	Programming Business Computers	3
SPEECH	100	Speech (Business Emphasis)	3

FOURTH SEMESTER			UNITS
ENGLISH	100	Technical English	3
BUS	33	Report Writing	3
CO. SCI	32	System Design Workshop I	3
CO. SCI	28	Programming Language	3

RECOMMENDED ELECTIVE COURSES			
CO. SCI	351	Data Entry Methods	3
CO. SCI	352	Principles of Business Data Processing 2	3
CO. SCI	353	Electronic Data Processing in Accounting	3
CO. SCI	354	FORTRAN Programming	3

FIRST SEMESTER UNITS

HUM 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

CO. SCI 1 Principles of Business Data Processing 3

The evolution, principles and application of electronic data processing equipment are covered as they relate to information flow in a business system. Input/Output communications, programming and system design, and case studies are introduced.

CO. SCI 7 RPG Programming 3

Prerequisite: CO. SCI 352

Lecture, 3 hours

This course will teach the use of the latest computer software within the environment of an operating system, integrating those higher level languages such as COBOL and FORTRAN with the use of supporting systems (Sort Merge, Report Program Generator and Assembler, etc.). The computer of reference will be 3rd. Generation Computers, such as IBM System 360, Honeywell 2200, GE 400-600 Compatibles.

CO. SCI 23 Programming Laboratory 1

Laboratory, 2 hours

Introduces interactive programming using BASIC. Terminal procedures and file manipulation are covered. Recommended for data processing majors and nonmajors.

FIRST SEMESTER (Cont.) UNITS

CO. SCI 11 Punched Card Accounting Systems and Management 3

Prerequisite: CO. SCI 1 and 352

Lecture, 3 hours

This course presents the basic principles of business computer programming using the RPG (Report Program Generator). The programming applications include accounting and management problems. Systems and program flowcharting is covered, with stress on coding techniques, debugging principles, and documentation.

SECOND SEMESTER

HIST. 100 U.S. History (Economic Emphasis) 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement to transfer to the California State University and Colleges.

ACCT. 1 Introductory Accounting I 5

Prerequisite: English 28 or equivalent. Prerequisite/Corequisite: Business 38

Lecture, 5 hours

This course emphasizes basic accounting theory and practice which includes an analysis of original entry and their relationship to the general ledger, controlling accounts and subsidiary ledgers, voucher system, periodic adjustments, work sheet, financial statements, and adjusting and closing the ledger. Included are the problems and a practice set.

SECOND SEMESTER (Cont.) UNITS

CO. SCI 27 Advanced FORTRAN Programming 3

Prerequisite: CO. SCI 354

Lecture, 3 hours

This advanced class in FORTRAN reviews and strengthens the fundamentals of the language. This course advances the student's knowledge by presenting additional instruction and training in the use of disk and tape operation used in third generation computer systems. Adequate lab time is allowed for punching, executing, and debugging at least three complex FORTRAN problems.

CO. SCI 18 COBOL Programming 3

Prerequisite: CO. SCI 352 or equivalent.

Lecture, 3 hours

COBOL (Common Business Oriented Language) is a language which facilitates the programming of computers. This course is intended to cover the four divisions, flow charting, and the logic used in COBOL. Computer manufacturers have agreed to provide COBOL compilers for an impressive array of computing systems. For this, as well as for other reasons, COBOL will play a major role in all programming.

THIRD SEMESTER

CO. SCI 10 Advanced COBOL Programming 3

Prerequisite: CO. SCI 11 or one year COBOL Programming

Lecture, 3 hours

Advanced ANS COBOL (American National Standard Common Business Oriented Language) uses the current implementation of the 1968 standard. All major manufacturers have implemented compilers that meet this standard. This course uses the advanced features of

THIRD SEMESTER (Cont.) UNITS

COBOL including the sort, report witer, direct access, modular programming, overlay structures, table searching, debugging language, and program efficiency. Interfacing with current operating systems will be included.

CO. SCI 18 Assembly Language Programming 3

Prerequisite: CO. SCI 311 and 352 or the equivalent

Lecture, 3 hours

The student will learn effectively to program the IBM System/370.

CO. SCI 333 Business Data Processing Systems 3

Prerequisite: CO. SCI 1 and 352

Lecture, 3 hours

This course consists of a detailed study of electronic data processing systems as applied to business. Payroll, inventory production control, retailing, and various other commonly used EDP applications and systems are studied.

CO. SCI 334 Programming Business Computers 3

Prerequisite: CO. SCI 1

Lecture, 3 hours

The principles of Business Data Processing are continued with main emphasis on computers. The basic principles and general concepts of programming are covered, providing the student with a basic computer programming course.

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery of everyday life. Emphasizes the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and

other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

FOURTH SEMESTER

ENGLISH 100 Technical English 3

Includes training for the students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

BUS 33 Report Writing 3

Prerequisite: English 28 or equivalent

Lecture, 3 hours

The written report as used in business, industry, and the technical profession is studied. Practice is giving in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

CO. SCI 341 System Design Workshop I 3

Prerequisite: CO. SCI 8

Lecture, 4 hours

Covers the designing and application of database management information systems.

CO. SCI 342 Programming Language 3

Prerequisite: CO. SCI 1

Lecture, 3 hours

FOURTH SEMESTER (Cont.) UNITS

This course is designed to teach the student the PL/1 language. PL/1 applicability to commercial problems will be studied. Each student will program several class problems in PL/1.

RECOMMENDED ELECTIVE COURSES

CO. SCI 351 Data Entry Methods 3

Prerequisite: Office Administration 1 or the ability to type 30 words per minute.

Lecture, 2 hours; Laboratory, 3 hours

This course includes the study of methods of data entry; card punch, key-to-tape, key-to-disk, terminals, etc. The student will study the terminology of data processing, formating of records, information retrieval techniques, the basic business data processing applications.

CO. SCI 352 Principles of Business Data Processing 3

Lecture, 3 hours

Introduces the basic concepts needed to design, write, document, and test computer programs.

CO. SCI 353 Electronic Data Processing in Accounting 3

Prerequisite: Accounting 1 or Accounting 21 or experience in the field.

Lecture, 3 hours

The course introduces the accountant to Electronic Business Data Processing and shows the accountant how to use data processing to service accounts. The course includes the use of punched paper tape devices, computers, data transmission, and the use of service bureaus in the preparation of payrolls, inventory reports, financial statements, general ledger accounts, etc.

RECOMMENDED ELECTIVE COURSES (Cont.) UNITS

CO. SCI 354 FORTRAN Programming 3

Prerequisite: CO. SCI 3 or equivalent

Lecture, 3 hours

Subjects to be covered include elements of the FORTRAN automatic codic language for digital computers, construction of program using the FORTRAN language, and FORTRAN sub-programs, a survey of FORTRAN compiler is in a program for translating the FORTRAN language to computer instructions, thus easing the programmer's task. Students check out all programs on a computer.

THE FUTURE

1984-85

DATA PROCESSING TECHNOLOGY

FIRST SEMESTER			HOURS/WEEK
CO. SCI	100	Introduction to Data Processing	3
CO. SCI	107	Programming in BASIC	4
CO. SCI	108	Computer Operations	2
ACCT.	101	Introductory Accounting	5
MATH	100	Elementary Algebra (if required)	5
ENGLISH	100	Technical English	3
SECOND SEMESTER			
CO. SCI	112	Data Processing Systems I	3
CO. SCI	114	RPG Programming	4
CO. SCI	110	Machine & Assembly Language	4
MATH	103	Computer Mathematics	3
ACCT.	102	Intermediate Accounting	5
THIRD SEMESTER			
MATH	209	Statistics	3
CO. SCI	212	COBOL 1	4
HIST.	100	U.S. History (Economic Emphasis)	3
CO. SCI	236	IBM Assembly	4
CO. SCI	237	Job Control Language	4
SPEECH	100	Speech (Business Emphasis)	3
FOURTH SEMESTER			
CO. SCI	214	COBOL 11	4
HUM.	100	Humanities (Man in Tech. Society)	3
CO. SCI	270	Data Base Management	3
CO. SCI	280	Advanced Assembly - Science Elective	4

THE FUTURE

1984-85

FIRST SEMESTER		HOURS/WEEK
CO. SCI 100	Introduction to Data Processing	3

Introduces fundamental concepts of data flow in a business and electronic data processing system and their applications to business and industry. Includes fundamentals of computers and other data processing equipment, of programming, software and file organization and of data communication.

CO. SCI 107	Programming in Basic	4

Provides an introduction to programming using the language BASIC. Included are terminal operating procedures and teleprocessing concepts. Recommended for noncomputer majors.

CO. SCI 108	Computer Operations	2

Gives the student "hands-on" experience with a computer and its peripheral equipment. Teaches the development and management of a computer center. Included are the concepts of an operating system and its capabilities.

ACCT. 101	Introductory Accounting	5

Introduces the fundamental principles and concepts of accounting as a basis for financial communication in business. Includes the study of the procedures in maintaining records of business transactions and the preparation of financial statements for the sole proprietorship service or merchandising firm. Special problems in control, accruals & deferrals, merchandise inventory, plant assets, and accounts receivable are also covered.

FIRST SEMESTER (Cont.) HOURS/WEEK

MATH 100 Elementary Algebra (if required) 5

Includes operations with algebraic expressions, solutions of linear equations, and inequalities. Solution system of first degree equations, quadratic equations; relations and functions and their graphs are also considered. No credit given for students who have completed Math 19.

ENGLISH 100 Technical English 3

Includes training, for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

SECOND SEMESTER

CO. SCI 112 Data Processing Systems I 3

Typical data processing systems are studied with emphasis on types of storage systems, data retrieval, and read-out. In the laboratory portion of the course, equipment for storage and handling, output and input processing, etc., is studied. Field trips are made to typical commercial installations.

CO. SCI 114 RPG Programming 4

Covers the basic principles and general concepts of programming and develops entry-level skill in the use of the RPG language. To be taught on Department's computer system.

CO. SCI 110 Machines & Assembly Language 4

The students will study the fundamentals and applications of IBM system/360 and system/370 Assembler Language. Topics covered include

SECOND SEMESTER (Cont.) HOURS/WEEK

numbering systems, system organization, instruction formats, data formats, PSW and interrupt. Also included are the writing of programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

MATH 103 Computer Mathematics 3

Covers the concepts of basic mathematical functions, algebraic and graphic equations, of operational knowledge. Trigonometry is investigated and its dependence on, and inter-relationships with, algebra are utilized in an applied approach.

ACCT. 102 Intermediate Accounting 5

Presents theory of recording valuation and presentation of current, fixed and intangible assets; current and long-term obligations; paid in capital and retained earnings; financial statement analysis; applications of funds and cash flow reporting.

THIRD SEMESTER

MATH 209 Statistics 3

Discusses measures of central tendency and dispersion, probability sampling, estimation, hypothesis testing, analysis of variance, chi square analysis, and some simple linear regression.

CO. SCI 212 COBOL 1 4

The student will study the fundamentals and applications of ANS COBOL. This will include language elements, program structure, COBOL entry formats, data movement, arithmetic operations. Also included is the coding of ANS COBOL programs employing table handling, tape and card input and output files and tape file maintenance.

THIRD SEMESTER (Cont.) HOURS/WEEK

HIST. 100 U.S. History (Economic Emphasis) 3

Stresses development and change in economic institutions Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement for transfer to the California State University and Colleges.

CO. SCI 236 IBM Assembly 4

Prepares the student to write application programs in Assembly Language for Central District's Computer system.

CO. SCI 237 Job Control Language 4

Includes basic concepts of Job and Data Management and how to code and debug the JOB EXECUTIVE, and DD statements. Students learn how to code, to override and to add statements and parameters, to cataloged procedures, and to assemble and run a program.

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery of everyday life. Emphasis on the types of speech required at meetings, at interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

FOURTH SEMESTER

CO. SCI 214 COBOL 11 4

The student will study advanced techniques found in ANS COBOL and IBM extension to the language. Topics covered include sequential disk processing, indexed sequential files (creation, sequential

FOURTH SEMESTER (Cont.) HOURS/WEEK

access, random access, update, maintenance), program debugging, sort/merge, subprogram linkage, source program library facility, and improved programming techniques including structured programming.

HUM 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

CO. SCI 270 Data Base Management 3

Covers the development and use of management information systems. Included are physical and logical structures, data independence and file organization for batch and online systems.

CO. SCI 280 Advanced Assembly Science Elective 4

Prepares the student to utilize the computer's Operating System which controls the application program and all Input/Output devices.

BUSINESS DATA PROCESSING

BUDGET ANALYSIS

THE PRESENT

1982-83

ACTIVITY CODE	OBJECT CODE	TITLE	CLASS CODE	BASIS	FTE	HOURS	REQUESTED BUDGET
							$
0703	1	INSTR.FTE	0741	C6	4.00		126,960
0703	31	INSTR.PT	0811	C		1,920.00	50,880
0703	2131	OFC&CL FTE	4569	A8	1.00		16,911
0703	2131	OFC&CL FTE	4569	A8B	.50		10,877
0703	4521	SUPPLIES	0000				2,132
0703	5632	RNTL SOFT	0000				1,440
0703	5651	RENTL EQUIP	0000				36,255
		TOTAL FOR ACTIVITY CODE 0703					245,455

BUSINESS DATA PROCESSING

BUDGET ANALYSIS

THE FUTURE

1984-85

ACTIVITY CODE	OBJECT CODE	TITLE	CLASS CODE	BASIS	FTE	HOURS	REQUESTED BUDGET
							$
0703	1111	INSTR.FTE	0741	C6	6.00		250,000
0703	1315	INSTR.PT	0811	C		2,500	75,000
0703	2131	OFC&CL FTE	4569	A8	1.00		20,000
0703	2131	OFC&CL FTE	4569	A8B	.50		12,000
0703	4521	SUPPLIES	0000				5,000
0703	5632	RNTL SOFT	0000				2,000
0703	5651	RNTL EQUIP	0000				20,000
		TOTAL FOR ACTIVITY CODE 0703					384,000

1982-83

Total number of BDP day students = 183 WSCH 1794

EXISTING COMPUTER LABORATORY (K-305)

Main items of Computer Equipment:

Prime Mini-Computer with 30 video terminals.

10 Terminals to operate with Honeywell Main Prime Computer.

10 Microcomputers (TRS 80-II)

PROPOSAL I: During 1982-83, transfer Business Data Processing, retitled Co. Sci, (4 FTE instructors) to the department of Math/ Physical and Biological Sciences. The new department of Math & Computer/Physical/Biological Sciences would contain 21 FTE instructors and would require the creation of a coordinator (J. Kozak's) position as opposed to a Department Chair. Merge the remainder of Office Administration with Business Administration to form the new Business Department under a Department Chairperson. These changes would involve a small reduction compared with the existing structure (elimation of one Department Chairperson).

D

MICROCOMPUTER MAINTENANCE TECHNOLOGY

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

MICROCOMPUTER MAINTENANCE TECHNOLOGY

The micro-computer, originally thought to be a miniature mini-computer, has now been identified as having an architecture and application unique to itself. Although the field requires preparation similar to that of Computer Maintenance Technology, the rigor and depth of coverage are somewhat less since the technician in this area is principally concerned with module-level maintenance and understanding. Individuals working in this field provide hardware maintenance service to microcomputers.

Prerequisites for the program are identical to those of the Computer Maintenance Technology curriculum, namely one year of high school algebra and one year of geometry within the previous four years with a grade of C or better or the equivalent pretechnical coursework.

The program provides instruction in electronic circuits, devices and measurement, as well as assembly language, Input/Output systems, and microprocessor systems.

Employment in the field would be primarily with large microcomputer manufacturing companies such as computer field service, customer service, or computer hardware service representatives. In addition, many third party maintenance organizations would utilize these graduates.

THE PRESENT

1982-83

MICROCOMPUTER MAINTENANCE TECHNOLOGY

There is no such program in existence at the present time.

THE FUTURE

1984-85

MICROCOMPUTER MAINTENANCE TECHNOLOGY

FIRST SEMESTER			HOURS/WEEK
MATH	100	Elementary Algebra	3
CO. SCI	105	Computer Logic and Arithmetic	7
ENGLISH	100	Technical English	3
EL.	100	Survey of Electronics	3
EL.	103	Electronics Drafting	4
SECOND SEMESTER			
EL.	101	Electric Circuits	7
CO. SCI	110	Machine and Assembly Language	4
MATH	105	Applied Math I (Integrated Algebra & Trigonometry)	3
HUM.	100	Humanities	3
CO. SCI	150	Introduction to Microprocessors	4
THIRD SEMESTER			
EL.	106	Electronic Devices	6
EL.	108	Measurement and Testing Laboratory I	4
CO. SCI	240	Microprocessor Systems	7
HIST.	100	U. S. History	3
SPEECH	100	Speech (Business Emphasis)	3
FOURTH SEMESTER			
EL.	240	Digital Systems	7
PHYS.	100	Introductory Physics	4
CO. SCI	120	Trouble-Shooting Peripherals	7
BUS	33	Report Writing	3

FIRST SEMESTER HOURS/WEEK

MATH 100 Elementary Algebra 5

Includes operations with algebraic expressions, solutions of linear equations, and inequalities. Solution of first degree equations, quadratic equations; relations and functions and their graphs are also considered.

CO. SCI 105 Computer Logic & Arithmetic 7

Studies the fundamentals of digital computers from a non-mathematical approach. The student is first introduced to general purpose computing systems and the concept of stored program computers. The basic ideas of programming are presented to develop an understanding of the logical organization of a digital system. The study of peripheral equipment touches upon card readers, punches, printers, tapes, and disc drives. Boolean algebra, logic, logic gates, and number systems are thoroughly discussed.

ENGLISH 100 Technical English 3

Includes training, for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

EL. 100 Survey of Electronics 3

Presents an overview of electronics and provides a general consumer understanding for the non-technical student. Emphasis is on the relationship of this field to other scientific fields, industry, business, the home and other users. The course will include lectures, demonstrations, films.

FIRST SEMESTER (Cont.) HOURS/WEEK

EL. 103 Electronics Drafting 4

Covers techniques of lettering, signs, and symbols as applied to electronics. Includes wiring diagrams, printed circuits, pictorials such as diametrics, obliques, and isometric presentations and packaging techniques. Component layout, highway and airline-type diagrams and perspective are also included.

SECOND SEMESTER

EL. 101 Electric Circuits (AC & DC Networks) 7

Instruction is given in basic electrical concepts, electron theory, Ohm's Law, Kirchhoff's Laws, series circuits, parallel circuits, combination circuits, principles of magnetism; and the care, use, and construction of basic meters for voltage, current, and resistance measurements. Problems illustrating accuracy necessary in measurements are given. Principles of alternating current, capacitance, inductance, reactance, impedance, resonance, transformers, and alternating current measuring devices are taught. Discussions are conducted on the effects of wave shape and A.C. measurements.

CO. SCI 110 Machine and Assembly Language 4

The students will study the fundamentals and application of IBM system/360 and system/370 Assembler Language. Topics covered include numbering systems, system organization. instruction formats, data formats, PSW and interrupt. Also included are the writing of programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

SECOND SEMESTER (Cont.) HOURS/WEEK

MATH 105 Applied Math I (Integrated Algebra & Trigonometry) 3

Provides an introduction to the practical application of mathematics as needed in industry. Fractions, decimals, percentage, square and square roots, constants, solids, etc. are reviewed. Emphasis is on the solution of technical problems beneficial to those engaged in an industrial trade.

HUM. 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

CO. SCI 150 Introduction to Microprocessors 4

Prerequisite: CO. SCI 50, 70 or equivalent.

Lecture, 2 hours; laboratory, 2 hours

Provides an overview of data communications using the DEC PDP 11/34 computer system for troubleshooting and hands on experience. The subjects covered include data communications systems, transactions, media, carriers, networks, checking, format, protocols, terminals and system configurations (hardware/software).

THIRD SEMESTER

EL. 106 Electron Devices (Solid State) 6

Presents principles of operation of semiconductor, diodes, bipolar transistors, fets, mosfets, and special purpose electron devices such as SCR'S, tunnel diodes, 4-layer devices, Zener devices, vacuum tubes, cathode ray tubes, color TV picture tubes. Provides analysis of DC load lines, power operating stabilization, common base, collector, and emitter configurations, and triode, tetrode, and beam

THIRD SEMESTER (Cont.) HOURS/WEEK

and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

FOURTH SEMESTER

EL. 240 Digital Systems 9

The student is responsible for running programs on the computer and for solving problems in a self-developed program.

PHYS. 100 Introductory Physics 4

This is an introductory survey course covering descriptively the major areas of physics. Mathematical solution of simple physics problems are covered.

CO. SCI 120 Trouble-Shooting Peripherals 3

The student learns the electronic and mechanical theory of operation of computer peripheral equipment such as paper tape punches, paper tape readers, and printers. Integrated circuit theory of operation on such circuits as gates, flip-flops, adders, and registers is presented. The student prepares to market newly acquired talents through local industry field trips, job interviews, resume-writing, and completion of job applications.

BUS 33 Report Writing 3

The written report as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

E

SOFTWARE SUPPORT TECHNICIAN

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTION

THE PRESENT

1982-83

SOFTWARE SUPPORT TECHNICIAN

There is no such program in existence at the present time.

THE FUTURE

1984-85

SOFTWARE SUPPORT TECHNICIAN

FIRST SEMESTER			HOURS/WEEK
CO. SCI	106	FORTRAN	4
EL.	101	Electric Circuits (AC and DC)	7
MATH	105	Applied Math I	3
CO. SCI	101	Introduction to Computer Programming	3
HUM.	100	Humanities	3
SECOND SEMESTER			
MATH	106	Applied Math II (Introductory Calculus)	3
CO. SCI	110	Machine and Assembly Language Programming	4
EL.	106	Electron Devices	4
ENGLISH	100	Technical English	3
CO. SCI	120	Trouble-Shooting Computer Peripherals	7
PHYS.	100	Introductory Physics (if required)	4
THIRD SEMESTER			
CO. SCI	223	Operating Systems	3
EL.	208	Digital/Analog Integrated Circuits	7
CO. SCI	220	Input/Output Devices	7
BUS	33	Report Writing	3
CO. SCI	222	Memory Systems	4
CO. SCI	236	IBM Assembly	4
FOURTH SEMESTER			
SPEECH	100	Speech (Business Emphasis)	3
CO. SCI	250	Data Communications Systems	4
CO. SCI	230	Computer Systems	7
HIST.	100	U. S. History	3
CO. SCI	237	Job Control Language	4

FIRST SEMESTER HOURS/WEEK

CO. SCI 106 FORTRAN 4

Introduces the student to computer principles. The student will program in the FORTRAN IV language, using a wide variety of applications. To be taught on the department's computer system.

EL. 101 Electric Circuits (AC & DC) 7

Instruction is given in basic electrical concepts, electron theory, Ohm's Law, Kirchhoff's Laws, series circuits, parallel circuits, combination circuits, principles of magnetism; and the care, use, and construction of basic meters for voltage, current, and resistance measurements. Problems illustrating accuracy necessary in measurements are given. Principles of alternating current, capacitance, inductance, reactance, impedance, resonance, transformers, and alternating current measuring devices are taught. Discussions are conducted on the effects of wave shape and A.C. measurements.

MATH 105 Applied Math I 3

Lecture, 3 hours

Provides an introduction to the practical application of mathematics as needed in industry. Fractions, decimals, percentage, square and square roots, constants, solids, etc., are reviewed. Emphasis is on the solution of technical problems beneficial to those engaged in an industrial trade.

CO. SCI 101 Introduction to Computer Programming 3

This is an introduction to the principles of store-program digital computers. Included are applications of digital computers; preparation of programs for solving problems of varying degrees of

FIRST SEMESTER (Cont.) HOURS/WEEK

difficulty, using a simplified coding system.

HUM. 100 Humanities (Man in Tech Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

SECOND SEMESTER

MATH 106 Applied Math II (Introductory Calculus) 3

Includes functions and limits, derivatives and their applications, differentials, integrals, and their applications.

CO. SCI 110 Machine and Assembly Language 4

The students will study the fundamentals and applications of IBM system/360 and system/370 Assembler Language. Topics covered include numbering systems, system organizacion, instruction formats, data formats, PSW and interrupt. Also included are the writing of programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

EL. 106 Electron Devices 4

Presents principles of operation of semiconductors, diodes, bipolar transistors, fets, mosfets, and special purpose electron devices such as SCR's, tunnel diodes, 4-layer devices, Zener devices, vacuum tubes, cathode ray tubes, color TV picture tubes. Provides analysis of DC load lines, power operating stabiiizing, common base, collector, and emitter configurations, and triode, tetrode, and beam power tube biasing.

SECOND SEMESTER (Cont.) HOURS/WEEK

ENGLISH 100 Technical English 3

Includes training, for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

CO. SCI 120 Trouble-Shooting Peripherals 7

The student learns the electronics and mechanical theory of operation of computer peripheral equipment such as paper tape punches, paper tape readers, and printers. Integrated circuit theory of operation on such circuits as gates, flip-flops, adders, and registers is presented. The student prepares to market newly acquired talents through local industry field trips, job interviews, resume writing, and completion of job applications.

PHYS. 100 Introductory Physics 4

This is an introductory survey course covering descriptively the major areas of physics. Mathematical solution of simple physics problems are covered.

THIRD SEMESTER

CO. SCI 223 Operating Systems 3

Analyzes a variety of computer operating systems; their organization, generation, and operation. Provides instruction and experience using Assembler-level languages to operate the system.

THIRD SEMESTER (Cont.) **HOURS/WEEK**

EL. 208 Digital/Analog Integrated Circuits 7

Covers theory and interface of linear and linear/digital interface integrated circuits. DC bias circuits, input/output resistance, drift, input offset/bias current, models, CMRR, open and closed loop gains and frequency response are covered. Application to differential, operational and video amplifiers. Voltage regulators, MOS interface, peripheral driver, core memory, line transmission circuits, and phase lock loop circuits.

CO. SCI 220 Input/Output Devices 7

Discusses input and output requirements of a computing system. Introduces the student to various types of input/output devices in a typical system including readers, punches, printers, visual displays, tape and disc drives. Individual trouble shooting projects are presented with the object of stressing mechanical, electrical and logical principles of operation.

BUS 33 Report Writing 3

The written report as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

CO. SCI 222 Memory Systems 4

This course introduces electronic control circuits using solid state devices and electron tubes and presents principles of memory devices, counting, adding, multiplying, and dividing circuits as used in a binary digital computer. The laboratory section gives

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THIRD SEMESTER (Cont.) **HOURS/WEEK**

working experience with a series of solid state circuits which function as logical elements or as amplifiers or power supplies in a modern digital computer.

CO: SCI 236 IBM Assembly 4

Prepares the student to write application programs in Assembly Language for the Central District's Computer system.

FOURTH SEMESTER

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery for everyday life. Emphasizes the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

CO. SCI 250 Data Communications Systems 4

Provides an overview of data communications using the DEC PDP 11/34 computer system for troubleshooting and hands-on experience. The subjects covered include data communications systems, transactions, media, carriers, networks, checking, format, protocols, terminals and system configurations (hardware/software).

CO. SCI 230 Computer Systems 7

Examines a computer system, using manufacturer's manuals. Circuitry and circuit tracing are studied to analyze how the computer performs various instructions. Diagnostics and trouble-shooting techniques are stressed.

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FOURTH SEMESTER (Cont.) **HOURS/WEEK**

HIST. 100 U. S. History 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement to transfer to the California State University and Colleges.

CO. SCI 237 Job Control Language 4

Includes basic concepts of Job and Data Management and how to code and debug the JOB EXECUTIVE, and DD statements. Students learn how to code, to override and to add statements and parameters to catalog procedures, and to assemble and run a program.

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F

DIGITAL ELECTRONICS TECHNOLOGY

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

DIGITAL ELECTRONICS TECHNOLOGY

The digital electronics technology curriculum leads to job placement in larger computer and microprocessor user corporations. Many engineering oriented companies who integrate computers into their final products hire in-house maintenance and technical personnel. In addition, large computer firms utilize depot-level maintenance technicians who must repair systems to the chip level. The computer electronics technician does not actively interface with customers but instead must work with field service personnel. The student entering the curriculum must have completed a prerequisite of one year of high school algebra and one year of geometry.

The emphasis in the training is focused on basic theory instead of trouble-shooting techniques. Specific course offerings include: Digital/Analog micro-integrated Circuits, Control Memory, Computer and Digital Systems and Network Analysis. The study of non-computer digital systems such as instruments controllers, numerical control systems, and signal sequencing is a major thrust of the curriculum.

THE PRESENT

1982-83

DIGITAL ELECTRONICS TECHNOLOGY

There is no such program in existence at the present time.

THE FUTURE

1984-85

DIGITAL ELECTRONICS TECHNOLOGY

FIRST SEMESTER			Hours/Week
EL.	101	Electric Circuits (AC and DC)	7
MATH	105	Technical Math I	3
CO. SCI	105	Computer Logic and Arithmetic	7
ENGLISH	100	Technical English	3
CO. SCI	106	FORTRAN	4
SECOND SEMESTER			
MATH	106	Technical Applied Math II	3
PHYS.	100	General Physics	4
EL.	106	Electron Devices	6
HUM.	100	Humanities	3
EL.	108	Measurement and Testing Laboratory I	4
THIRD SEMESTER			
CO. SCI	110	Machine and Assembly Language	4
EL.	208	Digital/Analog Microintegrated Circuits	7
EL.	210	Data Acquisition and Control Systems	4
HIST.	100	U. S. History	3
CO. SCI	222	Memory Systems	4
SPEECH	100	Speech (Business Emphasis)	3
FOURTH SEMESTER			
CO. SCI	240	Microprocessor Systems	4
CO. SCI	230	Computer Systems	7
EL.	240	Digital Systems	7
EL.	280	Diagram and Circuit Analysis	7
BUS	33	Report Writing	3

FIRST SEMESTER

Hours/Week

EL. 101 Electric Circuits (AC & DC) 7

Instruction is given in basic electrical concepts, electron theory, Ohm's Law, Kirchhoff's Laws, series circuits, parallel circuits, combination circuits, principles of magnetism; and the care, use, and construction of basic meters of voltage, current, and resistance measurements. Problems illustrating accuracy necessary in measurements are given. Principles of alternating current, capacitance, inductance, reactance, impedance, resonance, transformers, and alternating current measuring devices are taught. Discussions are conducted on the effects of wave shape and A.C. measurements.

MATH 105 Technical Math 1 3

Provides an instruction to the practical application of mathematics as needed in industry. Fractions, decimals, percentage, square and square roots, constants, solids, etc., are reviewed. Emphasis is on the solution of technical problems beneficial to those engaged in an industrial trade.

CO. SCI 105 Computer Logic and Arithmetic 7

Studies the fundamentals of digital computers from a non-mathematical approach. The student is first introduced to general purpose computing systems and the concept of stored program computers. The basic ideas of programming are presented to develop an understanding of the logical organization of a digital system. The study of peripheral equipment touches upon card readers, punches, printers, tapes, and disc drives. Boolean algebra, logic stages, and number systems are thoroughly discussed.

FIRST SEMESTER (Cont.)

Hours / Week

ENGLISH 100 Technical English 3

Includes training for students in the technical and industrial fields, in writing, reading, listening, and speaking, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

CO. SCI. 106 FORTRAN 4

Introduces the student to computer principles. The student will program in the FORTRAN IV language, using a wide variety of applications. To be taught on the department's computer system.

SECOND SEMESTER

MATH 106 Technical Applied Math II 3

Includes functions and limits, derivatives and their applications, differentials, integrals, and their applications.

PHYS. 100 General Physics 4

This is an introductory survey course covering descriptively the major areas of physics. Mathematical solution of simple physics problems are covered.

EL. 106 Electron Devices 6

Presents principles of operation of semiconductor diodes, bipolar transistors, fets, mosfets, and special purpose electron devices such as SCR's, tunnel diodes, 4-layer devices, Zener devices, vacuum tubes, cathode ray tubes, color TV picture tubes. Provides analysis for DC load lines, power operating stabilization, common base, collector, and emitter configurations, and triode, tetrode, and beam power tube biasing.

SECOND SEMESTER (Cont.) HOURS/WEEK

HUM. 100 Humanities 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

EL. 108 Measurement and Testing Laboratory I 4

The laboratory applies the principles of metrology and includes test equipment analysis and fault location techniques. Measurements and calibration of meters, bridges, analyzers. Power supply testing.

THIRD SEMESTER

CO. SCI. 110 Machine and Assembly Language 4

The students will study the fundamentals and applications of IBM system/360 and system/370 Assembler Language. Topics covered include numbering systems, system organization, instruction formats, data formats, PSW and interrupt. Also included are the writing of programs using standard and decimal instruction sets, and the use of standard linkage conventions for linking Assembler programs to precoded I/O routines.

EL. 208 Digital/Analog Microintegrated Circuits 7

Covers theory and interface of linear and linear/digital interface integrated circuits. DC bias circuits, input/output resistance, drift, input offset/bias current, models, CMRR, open and closed loop gains and frequency response are covered. Application to differential, operational and video amplifiers. Voltage regulators, MOS interface, peripheral driver, core memory, line transmission circuits, and phase lock loop circuits.

THIRD SEMESTER (Cont.) Hours/Week

EL. 210 Data Acquisition and Control Systems 4

This course covers the theory of operation and laboratory applications representative of existing "Data Acquisition and Control Systems" used in industry. The use of the computer in "Closing the Loop" is emphasized and examples of such applications are provided by field trips to local industrial installations.

HIST. 100 U. S. History 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement to transfer to the California State University and Colleges.

CO. SCI 222 Memory Systems 4

This course introduces electronic control circuits using solid state devices and electron tubes and presents principles of memory devices, counting, adding, multiplying, and dividing circuits as used in a binary digital computer. The laboratory section gives working experience with a series of solid state circuits which function as logical elements or as amplifiers or power supplies in a modern digital computer.

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery for everyday life. Emphazises the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

FOURTH SEMESTER

Hours/Week

CO. SCI 240 Microprocessor Systems 4

Provides an introduction to a survey of various microprocessor units with indepth analysis and operation of a selected microprocessor. Emphasis is placed on the architectrue, instruction set, I/O interfacing, and typical applications. Microprogramming techniques, microde, and control of memories are studied. Lab activity will include the writing, running, and debugging on short test routines. These routines will be similar to those used to check for hardware malfunctions.

CO. SCI 230 Computer Systems 7

Examines a computer system, using manufacturer's manuals. Circuitry and circuit tracing are studied to analyze how the computer performs various instructions. Diagnostics and trouble-shooting techniques are stressed.

EL. 240 Digital Systems 7

The student is responsible for running programs on the computer and for solving problems in a self-developed program.

EL. 280 Diagram and Circuit Analysis 7

This is a lecture course in reading plans and specifications in addition to drawing and constructing diagrams.

BUS 33 Report Writing 3

The written report as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

G

NUMERICAL CONTROL PROGRAMMING

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

NUMERICAL CONTROL PROGRAMMING

The numerical control programming curriculum trains students for employment in the field of automated control of machines. Many production and aerospace companies involved in either highly repetitive or highly precision machining functions incorporate numerical control machines in the generation of the tapes which control such processes as drilling, milling, and point-to-point, continuous path and circular interpolation machining control.

The numerical control programmer develops the techniques of planning operating sequencing, production machining, generating tapes either manually or through computer assistance. The student learns to use linear programming, APT, ADAPT, COMPACT II, and CADCAM languages.

Employment ranges from small production shops to large precision machining centers.

THE PRESENT

1982-83

NUMERICAL CONTROL PROGRAMMING

There is no such program in existence at the present time.

THE FUTURE

1984-85

NUMERICAL CONTROL PROGRAMMING

FIRST SEMESTER			HOURS/WEEK
MT	100	Basic Machine Shop Theory & Practice	4
DRAFT	16	Blueprint I	2
MATH	105	Technical Math I	3
NC	100	Introduction to Numerical Control	3
ENGLISH	100	Technical English	3
SECOND SEMESTER			
MT	101	Technology and Application of Machine I	4
NC	110	Numerical Control Computer Program	3
MATH	106	Applied Math II	3
CO. SCI	101	Introduction to Computer Prog.	3
HUM	100	Humanities (Man in Tech. Society)	3
THIRD SEMESTER			
NC	210	Compact II	3
MT	102	Principles of Machine Tools II	4
PHYSICS	100	Introductory Physics	4
HIST	100	U. S. History	3
HEALTH	10	Health	2
SPEECH	100	Speech (Business Emphasis)	3
FOURTH SEMESTER			
NC	220	Advanced Numerical Control	4
MT	103	Principles of Machine Tools III	4
MT	105	Introduction to Manufacturing Processes	3
NC	240	Principles of CAD/CAM	2
BUS	33	Report Writing	3

FIRST SEMESTER HOURS/WEEK

MT 100 Basic Machine Shop Theory & Practice 4

This course covers the principles of basic hand tools and machine tools such as drills, files, taps, reamers, lathes, milling machines, drill presses, saws, and pedestal grinders. Safety and good shop practice are emphasized. This course includes lecture and laboratory demonstration.

DRAFT 16 Blueprint I 2

Concurrent requirement: Machine Shop 111, 112 and 113

Lecture, 3 hours

This course offers instructions in the principles of reading and interpreting industrial blueprints as applied to the machine trade.

MATH 105 Technical Math I 3

Provides an instruction to the practical application of mathematics as needed in industry. Fractions, decimals, percentage, square and square roots, constants, solids, etc., are reviewed. Emphasis is on the solution of technical problems, beneficial to those engaged in an industrial trade.

NC 100 Introduction to Numerical Control 3

Introduces the student to the computer language used by part programmers. Emphasis is placed upon the APT language for two and three axis point-to-point and continuous path contouring machines. Purpose, program nomenclature and symbols, geometric definitions, applications, computing, motion instructions, sequences repetitive programming techniques and special capabilities are discussed. Students will write their own practice program.

FIRST SEMESTER (Cont.)

HOURS/WEEK

ENGLISH 100 **Technical English** 3

Includes training for students in the technical and industrial fields, in writing, reading, listening, and spealing, with emphasis on the writing of technical reports, directives, memoranda, specifications. Includes preparation and presentation of oral reports and preparation of an occupational resume.

SECOND SEMESTER

MT. 101 Technology and Application of Machine 4

Basic machine shop instruction is offered in the technology and application of machining. Areas such as filing, threading, tapping, layout, and free-hand grinding are explored. Also, the basic set-ups and operation of drill presses, lathes, and milling machines, along with safety are emphasized.

NC 110 Numerical Control Computer Program 3

Introduces the student to the computer language used by part programmers. Emphasis is placed upon the APT language for two and three axis point-to-point and continuous path contouring machines. Purpose, program nomenclature and symbols, geometric definitions, applications, computing, motion instructions, sequences, repetitive programming techniques and special capabilities are discussed. Students will write their own practice programs.

MATH 106 Applied Math II 3

Includes functions and limits, derivatives and their applications, differentials, integrals, and their applications. Replaces Math 8.

CO. SCI 101 Introduction to Computer Programming 3

This is an introduction to the principles of store-program digital

SECOND SEMESTER (Cont.) Hours/Week

computers. Included are applications of digital computers; preparation of programs for solving problems of varying degrees of difficulty, using a simplified coding system.

HUM 100 Humanities (Man in Tech. Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

THIRD SEMESTER

NC 210 Compact II 3

Acquaints the advance student with the Compact II computer language, the computer time sharing and mini-computers and their application to the modern machine shop.

MT 102 Principles of Machine Tools II 4

Lecture, laboratory and demonstrations. Advanced principles of lathes and milling machines, their attachments and accessories. Principles of special turning and milling machines. Introduction to advanced machinery.

PHYS 100 Introductory Physics 4

This is an introductory survey course covering desciptively the major areas of physics. Mathematical solution of simple physics problems are covered.

HIST 100 U. S. History 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement to transfer

THIRD SEMESTER (Cont.) HOURS/WEEK

to the California State University and Colleges.

HEALTH 10 Health 2

This course deals with problems in the field of personal and community hygiene, nutrition, sanitation, mental hygiene, and social hygiene. It is designed to assist students in developing worthwhile attitudes.

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery of everyday life. Emphazises the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

FOURTH SEMESTER

NC 220 Advanced Numerical Control 4

Continues the study of tape preparation, beginning Numerical Control 1, and develops the techniques of planning for efficient operation sequencing, tool and fixture design and use, and proper production machining procedures. Introduces the student to the machining of complex parts of varied design with close tolerance and finish limits. Allows the student to work with tapes he/she has produced and ones made by computers. Studies design and use of tool changers, and manual quick change tooling. Investigate the tape format and problems.

MT 103 Principles of Machine Tools III 4

This course covers advanced principles and demonstrations of lathes and mills and their attachments. It also offers instruction

on Jig Bore, Jig Grind, O.D. and I.D. Grinder, and Surface Grinder.

MT 105 Introduction to Manufacturing Processes 3

This course is a study of the manufacturing processes utilized in the production of types of products and components. This course is helpful in the business of producing parts from metals and plastics.

NC 240 Principles of CAD/CAM 2

Introduces the fundamental concepts of computer-aided design and computer aided Manufacturing to the student intending to pursue specialized work in either computer Programming, Computer Technology, Drafting, or Numerical control. Coverage includes computer system components, its operation and programming. Also, CAD/CAM equipment operation, Programming and system design.

BUS 33 Report Writing 3

The written report as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapted to the business and professional needs of the student.

H

ROBOTICS TECHNICIAN

ASSOCIATE IN SCIENCE DEGREE

COURSE DESCRIPTIONS

THE PRESENT

1982-83

ROBOTICS TECHNOLOGY

There is no such program in existence at the present time.

ROBOTICS TECHNOLOGY

After completion of this program, the student is prepared to enter a career as a robotics maintenance technician in a manufacturing or assembly plant. It is expected that automated manufacturing will expand substantially in Southern California during this decade. The successful graduate will be able to troubleshoot and repair electrical motors and circuits, mechanical devices, hydraulic systems, electronics and digital circuits and devices.

A. S. Degree in Robotics may be earned by completing at least 18 semester units in general education as specified in the college catalog.

THE FUTURE

1984/85

ROBOTICS TECHNOLOGY

FIRST SEMESTER			HOURS/WEEK
MATH	49	Technical Mathematics II	3
PHYS	6	General Physics I	6
ROBTEK	111	Basic Electrical Theory and Practice	12
HUM	100	Humanities (Man in Technological Society)	3
SECOND SEMESTER			
MATH	50	Technical Mathematics III	3
PHYS	7	General Physics II	6
ROBTEK	121	Basic Electronic Theory and Practice	9
ROBTEK	122	Electric & Electronic Drafting	3
HIST.	100	U.S. History (Economic Emphasis)	3
THIRD SEMESTER			
ROBTEK	131	Digital Electronics	9
ROBTEK	132	Power Trasmission Principles and Practice	6
ROBTEK	133	Microprocessor Programming	6
BUS	33	Report Writing	3
FOURTH SEMESTER			
ROBTEK	141	Electrical Installation and Maintenance	9
ROBTEK	142	Mechanical Installation and Maintenance	6
ROBTEK	143	Electronic Installation and Maintenance	6
SPEECH	100	Speech (Business Emphasis)	3

FIRST SEMESTER HOURS/WEEK

MATH 49 Technical Mathematics II 3

This is a course in practical mathematics for students planning to enter one of the technical fields. In scope it is limited to a treatment of methods of applied algebra. Stress is placed upon the application of these principles.

PHYS 6 General Physics I 6

In this course the student receives a survey of physics at the precalculus level, with emphasis on mechanics, wave motion, fluids, heat and thermodynamics. The laboratory consists of engineering applications and problem solving.

ROBTEK 111 Basic Electrical Theory and Practice 12

Basic concepts; current voltage resistance; work, energy, power; RLC circuits, alternating current, complex AC circuits; network theorems; power in AC circuits, polyphase circuits and devices.

HUM 100 Humanities (Man in Technological Society) 3

Examines art, music, literature, drama, philosophy, and history in an exploration of the urban environment and society as it has been affected by technology.

SECOND SEMESTER

MATH 50 Technical Mathematics III 3

Advanced topics in algebra, geometry and trigonometry are considered in relation to their usefulness to persons employed in industry; applications and basic calculus are included.

SECOND SEMESTER (Cont.) HOURS/WEEK

PHYS 7 General Physics II 6

In this course the student receives a survey of physics at the precalculus level, with emphasis on electricity and magnetism, optics and modern physics. The laboratory consists of engineering applications and problem solving.

ROBTEK 121 Basic Electronics Theory and Practice 9

Semi conductor theory; rectification and power supplies; bipolar junction transistros; electronic amplifiers and field effect transistors.

ROBTEK 122 Electric and Electronic Drafting 3

Lettering, linework and symbols; schematic diagrams; one line, elementary and riser diagrams; wire and cable schedules; power distribution flow and logic diagrams; electronic drafting.

HIST. 100 U. S. History (Economic Emphasis) 3

Stresses development and change in economic institutions. Considers the nature of American Capitalism and the effects of industrialization on American economic life. Also fulfills a portion of the United States History and Constitution requirement to transfer to the California State University and Colleges.

THIRD SEMESTER

ROBTEK 131 Digital Electronics 9

Number systems; conversions; BCD code; switching; digital logic gates; flip-flops; multivibrators; register, multiplexer; encoders and decoders; counters; D/A and A/D converters; microprocessors and applications.

THIRD SEMESTER (Cont.) HOURS/WEEK

ROBTEK 132 Power Transmission Principles and Practice 6

Transformers; single and three phase power transmission; wiring for power distribution; feeders and branch circuits; hydraulic and pneumatic principles and practices; gear train applications

ROBTEK 133 Microprocessor Programming 6

Definitions; internal representations of information; external representation of information; assembly language programming; high level language programming; PL/M and BASIC programming; digital control and microprocessor programming.

BUS 33 Report Writing 3

The written report as used in business, industry, and the technical profession is studied. Practice is given in organizing and presenting factual material with clarity, definiteness, conciseness. The content of the course will be adapated to the business and professional needs of the student.

FOURTH SEMESTER

ROBTEK 141 Electrical Installation and Maintenance 9

Electrical branch circuits; power supplies; directional and braking control of DC motors; control of Servo motors; digital control of stepping motors; specialized controllers and sensors.

ROBTEK 142 Mechanical Installation and Maintenance 6

Hydraulic installations; pumps valves and piping; hydraulic actuators; maintenance of hydraulic systems; installation and

maintenance of pneumatic systems and mechanical gear trains.

ROBTEK 143 Electronic Installation and Maintenance 6

Digital automation with microprocessors; interfacing auxiliary circuits; encoders, photo cells; ultrasonics and specialized controllers; trouble shooting digital control systems.

SPEECH 100 Speech (Business Emphasis) 3

Gives training in speech preparation and delivery of everyday life. Emphasizes the types of speech required at meetings, and interviews, with practice in using illustrations, visual aids, and other useful devices. Develops poise and self-confidence, gives attention to techniques of leadership, and interpersonal communication skills.

MAIN COMPUTER CENTER

It is proposed that the new Computer Center (plan attached) would be located in the basement or on the wings of the Learning Resources Center. This center would contain the following:

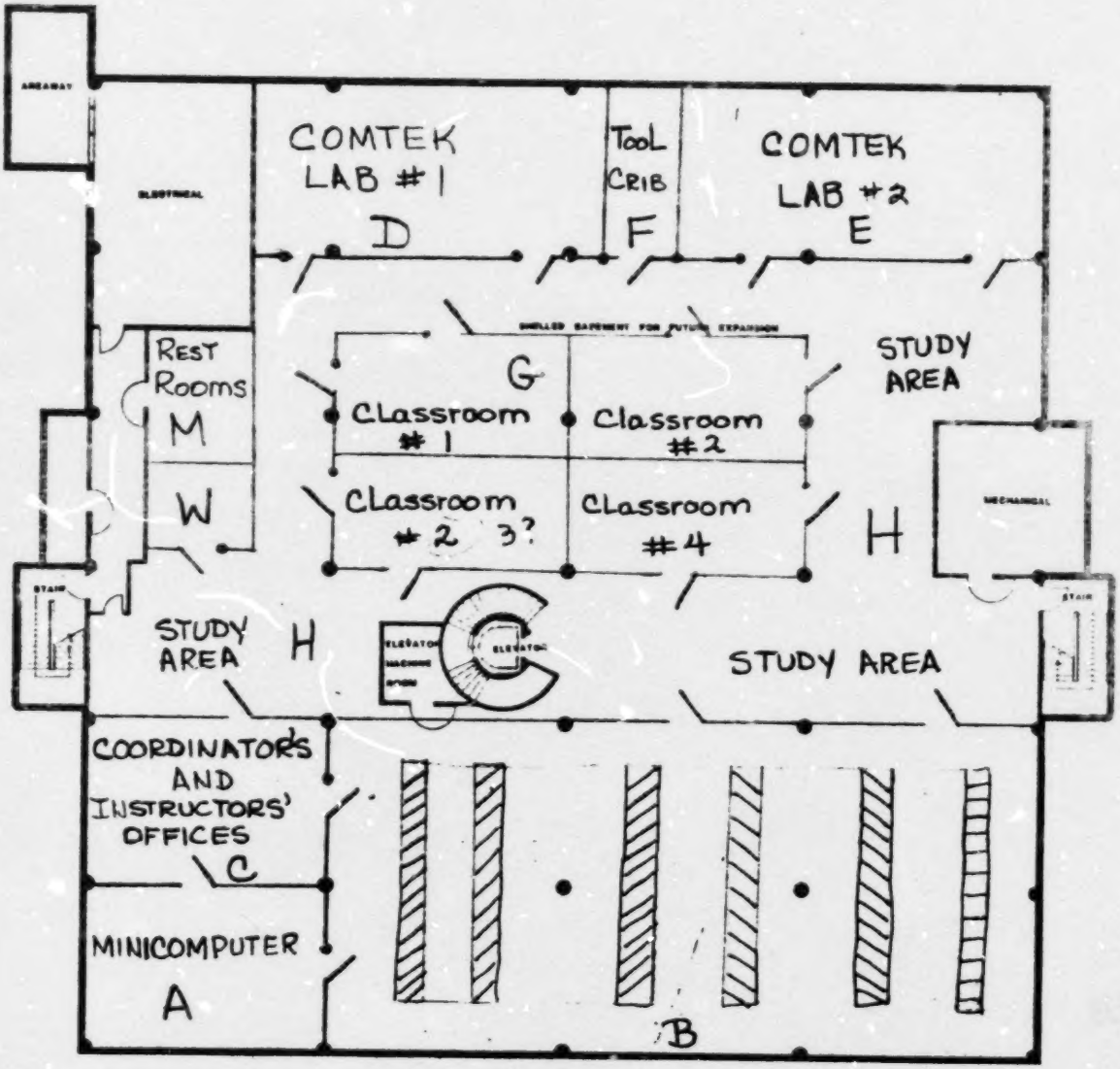
1. Microcomputer (Xerox) 3 megabyte memory - Area A.
2. 45 videoterminals for the minicomputer - Area B.
3. 30 microcomputers - TRS 80 II (as upgraded) - Area B.
4. 15 terminals for interface with District Main Frame computer - Area B.
5. Coordinator's and instructors' offices - Area C.
6. COMTEK Lab #1. Containing 20 IBM Microcomputers. - Area D. (approximately 50' X 20').
7. COMTEK Lab #2. Containing 20 Hewlett - Packard Microprocessor labs - Area E. (approximately 50' X 20').
8. Tool Crib to serve Labs # 1,2. - Area F.
9. Four classrooms (each 35' X 20') - Area G.
10. Study Areas - Area H.

Approximate Equipment Cost

1.	Minicomputer with termirals and software	$ 400,000.00
2.	30 Microcomputers with software	150,000.00
3.	15 Terminals for interference with Main Frame District Computer	50,000.00
4.	A & I for COMTEK Labs	20,000.00
5.	Equipment for COMTEK Labs	200,000.00
6.	Miscellaneous A & I	180,000.00
	TOTAL	$ 1,000,000.00

COMPUTER CENTER

The Computer Center will be capable of providing training for eight a.m. classes (7 a.m. - noon), eight p.m. classes (noon - 5 p.m.) and eight evening classes (6:30 - 9:30 p.m.). Each class will have a limit of 40 students as determined by the available number of lab stations. Maximum WSCH capability = (5+5+3) X 5 X 40 = 20,800. The center could also be used for additional training purposes with interdisciplinary courses.



BASEMENT FLOOR PLAN

VIDEO TERMINALS FOR MINI-COMPUTER

MICRO COMPUTER

TERMINALS FOR INTERFACE

NORTH

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1982-83

Total number of BDP day students = 183 WSCH 1794

EXISTING COMPUTER LABORATORY (K-305)

Main items of Computer Equipment:

Prime Mini-Computer with 30 video terminals.

10 Terminals to operate with Honeywell Main Prime Computer.

10 Microcomputers (TRS 80-II)

PROPOSAL I: During 1982-83, transfer Business Data Processing, retitled Co. Sci, (4 FTE instructors) to the department of Math/ Physical and Biological Sciences. The new department of Math & Computer/Physical/Biological Sciences would contain 21 FTE instructors and would require the creation of a coordinator (J. Kozak's) position as opposed to a Department Chair. Merge the remainder of Office Administration with Business Administration to form the new Business Department under a Department Chairperson. These changes would involve a small reduction compared with the existing structure (elimination of one Department Chairperson).

COMPUTER MAINTENANCE TECHNOLOGY

BUDGET ANALYSIS

THE FUTURE

1984-85

ACTIVITY CODE	OBJECT CODE	TITLE	CLASS CODE	BASIS	FTE	HOURS	REQUESTED BUDGET
							$
0791	1121	INSTR.FTE	0741	C6	3.00		80,000
0791	1125	INSTR. PT	0811	C		480.00	16,000
0791	4521	SUPPLIES	0000				10,000
		TOTAL FOR ACTIVITY CODE 0791					106,000

PROPOSAL II: Following the creation of the Computer High Technology Center (1984-85?), transfer the COMTEK program to the Department of Math, Computer/Physical/Biological Sciences. The department instructor complement would be increased to 23 FTE positions. This change would involve no increase in budget.

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APPENDIX A

LIST OF FUTURE COURSES

LIST OF FUTURE COURSES

ELETRONICS COURSES

EL.	100	Survey of Electronics
EL.	101	Electric Circuits (AC & DC Networks)
EL.	103	Electronics Drafting
EL.	106	Electronics Devices
EL.	108	Measurement and Testing Laboratory I
EL.	208	Digital/Analog Microintegrated Circuits
EL.	210	Data Acquisition and Control Systems
EL.	240	Digital Systems
EL.	280	Diagram and Circuit Analysis

MATHEMATICS COURSES

MATH	49	Technical Math II
MATH	50	Technical Math III
MATH	100	Elementary Algebra
MATH	103	Computer Mathematics
MATH	105	Applied Math I (Integrated Algebra & Trigonometry)
MATH	106	Applied Math II (Introductory Calculus)
MATH	207	Applied Math III (Differential Equations)
MATH	209	Statistics

PHYSICS COURSES

PHYS	6	General Physics I
PHYS	7	General Physics II
PHYS	11	Introductory Physics
PHYS	29	Basic Physics for Technicians
PHYS	100	Introductory Physics
PHYS	101	General Physics I

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COMPUTER SCIENCE COURSES

CO SCI	100	Introduction to Data Processing
CO SCI	101	Introduction to Computer Programming
CO SCI	102	Programming in PASCAL
CO SCI	105	Applied Math I (Integrated Algebra & Trigonometry)
CO SCI	106	Fortran IV
CO SCI	107	Programming BASIC
CO SCI	108	Computer Operations
CO SCI	110	Machine and Assembly Language Programming
CO SCI	112	Data Processing Systems I
CO SCI	114	RPG Programming
CO SCI	120	Trouble-Shooting Computer Peripherals
CO SCI	150	Introduction to Microprocessors
CO SCI	212	COBOL I
CO SCI	214	Advanced COBOL or FORTRAN
CO SCI	220	Input/Output Devices
CO SCI	222	Memory Systems
CO SCI	223	Operating Systems
CO SCI	230	Computer Systems
CO SCI	236	IBM Assembly
CO SCI	237	Job Control Language
CO SCI	240	Microprocessor Systems
CO SCI	250	Data Communications Systems
CO SCI	270	Data Base Management
CO SCI	280	Advanced Assembly

NUMERICAL CONTROL

NT	100	Basic Machine Shop Theory & Practice
NT	101	Technology and Application of Machine I

NUMERICAL CONTROL (cont.)

MT	102	Principles of Machine Tools II
MT	103	Principles of Machine Tools III
MT	105	Introduction to Manufacturing Processes
NC	100	Introduction to Numerical Control
NC	110	Numerical Control Computer Program
NC	210	Compact II
NC	220	Advanced Numerical Control
NC	240	Principles of CAD/CAM

ROBOTICS TECHNOLOGY

ROBTEK	111	Basic Electrical Theory and Practice
ROBTEK	121	Basic Electronic Theory and Practice
ROBTEK	122	Electric & Electronic Drafting
ROBTEK	131	Digital Electronics
ROBTEK	132	Power Transmission Principles and Practice
ROBTEK	133	Microprocessor Programming
ROBTEK	141	Electrical Installation and Maintenance
ROBTEK	142	Mechanical Installation and Maintenance
ROBTEK	143	Electronics Installation and Maintenance

MISCELLANEOUS

ENGLISH	100	Technical English
HIST	100	U. S. History (Economic Emphasis)
HIST	101	U. S. History (Economics Viewpoint)
HUM	100	Humanities
SPEECH	100	Speech (Business Emphasis)
ACCT	101	Introductory Accounting
ACCT	102	Intermediate Accounting
DRAFT	16	Blueprint I
HEALTH	10	Health

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